

Bendix® E-2™ & E-3™ Brake Valves

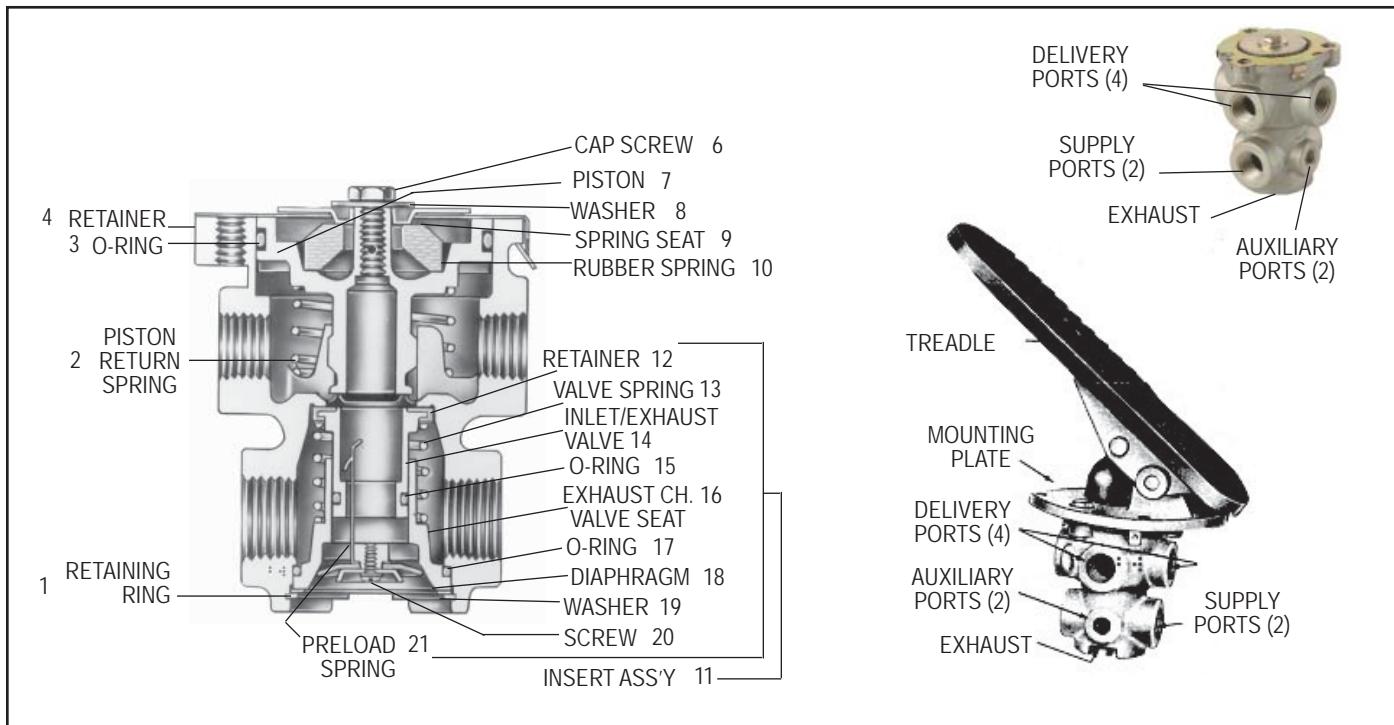


FIGURE 1 - E-3™ BRAKE VALVE (SECTIONAL VIEW)

E-2™ - E-3™ BRAKE VALVE

DESCRIPTION

The Bendix® E-2™ and E-3™ brake valves are single circuit brake valves that provide the driver with single point control of the service braking system. The valve can be either treadle operated or fitted with a lever for a linkage connection to a conventional brake pedal. Movement of the treadle or pedal controls the graduated application and release of air pressure to the vehicle brake actuators, applying or releasing the vehicle brakes.

The E-2™ and E-3™ brake valves utilize a rubber spring confined in a retainer, resulting in reduced plunger travel as compared to previous design single circuit brake valves.

The E-3™ brake valve differs from the E-2™ valve in that it employs a different piston (see insert Fig. 1), which requires greater plunger travel. Because of the greater plunger travel, the E-3™ valve provides less sensitivity in the 0-40 psi application range as compared to the E-2™ valve. Other than the different pistons, the E-2™ and E-3™ valves are identical. An identification washer, located under the retaining ring in the valve's exhaust port, provides a means of identifying the E-2™ and E-3™ brake valve.

The E-2™ and E-3™ valves have an insert type inlet/exhaust valve assembly which can be removed without disconnecting air lines. An exhaust check valve in the bottom of the insert prevents contaminants from entering the valve through the exhaust port. An optional exhaust extension is available should an exhaust carry-off line be required.

Porting consists of two (2) 1/2 inch P.T. supply ports, four (4) 3/8 inch or 1/2 inch P.T. delivery ports, and two (2) 1/4 inch P.T. accessory ports (in the supply portion of the valve).

OPERATION

Applying

Applying the treadle or pedal exerts a force on the plunger, rubber graduating spring and piston. The downward movement of the piston causes the piston stem (which is the exhaust seat) to contact the valve, closing the exhaust. As the exhaust closes, the inlet valve moves away from its seat. Air pressure is then allowed to flow by the inlet valve, out the delivery ports and to the brake actuators, applying the brakes.

Balanced

When the air pressure in the cavity beneath the piston and the air pressure being delivered to the brake actuators equals the mechanical force on the top of the piston, the piston lifts and the inlet valve closes, cutting off any further flow of air from the supply line through the valve. The exhaust remains closed, preventing any escape of air through the exhaust port.

When applications in the above average pressure range are made, the valve reaches a balanced position as the air pressure beneath the piston equals the effort exerted by the driver's foot on the pedal or treadle. When the piston is pressed down all the way, the inlet valve remains open and reservoir pressure is delivered to the actuators.

Releasing

When the treadle or pedal application is released, mechanical force is removed from the top of the piston, air pressure beneath the piston lifts the piston; (the inlet valve is closed) the exhaust in the valve is open and the air beneath the piston and in the delivery lines is exhausted through the exhaust port.

PREVENTIVE MAINTENANCE

Important: Review the warranty policy before performing any intrusive maintenance procedures. An extended warranty may be voided if intrusive maintenance is performed during this period.

Because no two vehicles operate under identical conditions, maintenance and maintenance intervals will vary. Experience is a valuable guide in determining the best maintenance interval for any one particular operation.

Visually check for physical damage to the brake valve such as broken air lines and broken or missing parts.

Every 3 Months, 25,000 Miles or 900 Operating Hours

Lubricate all mechanical actuation (pedal) parts with light (10W) oil. Apply 2 to 4 drops of oil between the plunger and mounting plate. DO NOT OVER OIL!!!

Lever/linkage operated valves should be adjusted so that the roller just contacts plunger. Check for integrity of mounting plate and treadle and/or pedal.

SERVICE TESTS

Operating Test (IMPORTANT!!! Tests should be conducted with an accurate test gauge.)

Install gauge in a delivery port or line; depress the treadle or pedal to several positions between fully released and fully applied positions, checking the delivery pressure on the gauge to see that it varies proportionately with the movement of the treadle or pedal. In the fully applied position, the reading on the gauge should be approximately that of full reservoir pressure. Upon release of the application, the reading of the test gauge should fall to zero psi immediately.

Leakage Test

With 100 psi supply pressure and valve in released position, coat exhaust port with soapsuds and check for leakage. NO leakage permitted.

Fully apply valve and hold application. Coat exhaust port with soapsuds. NO leakage permitted. Coat area around top of valve with soapsuds. NO leakage permitted.

If the valve does not function as described or leakage is excessive, it is recommended that it be replaced with a new or remanufactured unit, or repaired with genuine Bendix parts available at our distributors.

REMOVING AND INSTALLING

Removing

Block and hold vehicle by means other than air brakes.

Drain air brake system.

*If only the insert is to be removed, remove retaining ring, and pull insert out.

If entire valve is to be removed, disconnect air lines from valve.

Remove mounting bolts and remove valve.

Installing

Clean air lines connecting to valve.

Install valve and tighten mounting bolts.

Connect air lines to valve (plug any unused ports).

Test valve as outlined under "Service Tests."

NOTE: When installing a new or rebuilt insert, pre-check movement of the inlet and exhaust valve in the exhaust seat by depressing the insert. Precaution should be taken to prevent damage to the inlet and exhaust valve and the exhaust check valve grommet, when installing the insert in the valve. After placing the insert in the valve body, depress the exhaust check valve seat and install the retaining ring. Make sure the retaining ring snaps into the body groove.

DISASSEMBLY

NOTE: Disassembly and assembly instructions are keyed to Fig. 1 sectional view.

1. Remove treadle or lever assembly, boot and plunger.
2. Depress piston assembly and remove retainer (4).
3. Remove piston assembly (7) and piston return spring (2) from body.
4. Remove o-ring (3) from piston (7).
5. Remove cap screw (6), washer (8), spring seat (9), and rubber spring (10) from piston assembly (7).
6. Remove retaining ring (1) and inlet/exhaust insert assembly (11) from body.

Insert Disassembly

NOTE: It is recommended that entire inlet/exhaust insert be replaced as an assembly.

7. Remove o-ring (17) from check valve seat (16).
8. Remove screw (20), washer (19), and diaphragm (18).
9. Depress and hold insert, and remove preload spring (21).
10. Remove inlet/exhaust valve (14), valve spring (13), and o-ring (15).
11. Remove valve retainer (12).

Cleaning and Inspection

Wash all metal parts in mineral spirits and dry. Wipe all rubber parts clean.

Inspect all parts for excessive wear or deterioration.

Inspect valve and valve seats for nicks and burrs.

Check springs for cracks, distortion or corrosion.

Inspect exhaust check diaphragm for flexibility, wear, and deterioration.

Replace all parts not considered serviceable during these inspections.

ASSEMBLY

1. Lightly lubricate the piston, valve bores, and o-rings with Dow Corning 55-M pneumatic grease (Bendix piece number 291126).
2. Position rubber spring (10) in piston (7).
3. Install spring seat (9), washer (8), and cap screw (6). Torque cap screw to 50 inch pounds.
4. Install piston o-ring (3) and place piston return spring (2) in body.
5. Install piston retainer (4). Be certain the prongs snap over groove in valve body.

GENERAL SAFETY GUIDELINES

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.
2. Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.
3. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
4. If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work

Insert Assembly

6. Position preload spring (21) in exhaust check valve seat (16).
7. Install diaphragm (18), diaphragm washer (19) (with lips pointing out), and install screw (20). Tighten screw securely.
8. Install o-ring (15) and valve retainer (12) on inlet / exhaust valve body (14).
9. Install valve spring (13) on exhaust check valve seat (16) and install inlet/exhaust valve (14) into exhaust valve seat (16). Press the valve down until the preload spring snaps and holds the assembly together.
10. Install o-ring (17) on exhaust check valve seat (16).
11. Place inlet/exhaust insert in valve body; position identification washer. Press the insert down while installing retaining ring (1). Make certain retaining ring snaps into body groove, thus locking in the insert in place.

Testing A Rebuilt E-2™ or E-3™ Brake Valve

Perform operating and leakage tests as outlined in "Service Tests" section.

on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.

5. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
6. Never exceed manufacturer's recommended pressures.
7. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
8. Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
9. Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
10. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
11. For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.

